animal manure, and stated that he had always found the ergot most abundant in the grasses of churchyards.

June 24.—"On the Germination of Plants." By Dr. Lankester.

The author took the following view of the phænomena:—That the only essential process in germination is the growth of the young plant, or embryo. The process of development of the embryo, from primitive cytoblasts developing its tissues, is precisely the same as that of every other part of the plant, and from an identity of structure an identity of function might be inferred. But the ordinary theory of germination gave a different function to the tissues of the embryo. The author regarded the absorption of oxygen, the disengagement of carbonic acid gas and ammonia, as the consequence of the decomposition of the starch and proteine contained in the albumen or perisperm of the seed; and that the growing cells of the embryo appropriated the carbonic acid, ammonia and water, just in the same way as all other cells in the vegetable kingdom.

Mr. Westwood made some remarks on the Honey-Bee.—After shortly noticing the general œconomy of the hive-bee as to the production of queens and the swarming of casts, he contended, from the analogy between the circumstances connected with the latter event and those which accompany the swarming of ants, gnats, white ants, mayflies, &c.,—1st, that the swarming of insects has for its principal object the union of the sexes; 2nd, that from analogy with other insects subject to swarming, it is to be inferred that that species does not differ in this respect from other swarming species; and, 3rd, that it is the newly-hatched, and not the old queen which leads off the swarm.

June 25.—"Notes on the Irish Species of Robertsonian Saxifrages." By Mr. Andrews.

The author having studied the Irish Saxifrages, and compared them with those of the Pyrenees, had come to a different conclusion from Mr. Babington, and believed that there were only two true species in Ireland, the *Saxifraga umbrosa* and the *S. Geum*. The other species described by Mr. Babington in his 'Manual,' he regarded as varieties of one or other of these forms.

ROYAL SOCIETY.

June 19, 1845.—"The Blood-Corpuscle considered in its different phases of development in the Animal Series." By Thomas Wharton Jones, Esq., F.R.S., Lecturer on Anatomy, Physiology and Pathology, at the Charing Cross Hospital.

This paper is divided into three parts: the first relating to the blood-corpuscles of the Vertebrata; the second to those of the Invertebrata; and the last to a comparison between the two. He first describes the microscopic appearances of these corpuscles in different classes of vertebrate animals, beginning with the skate and the frog, and proceeding to birds and mammifera; first in their early embryonic state, and next in the subsequent periods of their growth. He finds in oviparous vertebrata generally, four principal forms of

corpuscles. These he distinguishes as the phases, first of the *granule blood-cell*, which he describes as a cell filled with granules, disclosing by the solvent action of dilute acetic acid on these granules a vesicular, or as the author terms it, a "*cellæform*" nucleus. These granule cells appear under two stages of development, namely, the coarsely granulous stage and the finely granulous stage. The second phase is that of the *nucleolated blood-cell*, oval in shape, containing a vesicular (or "cellæform") nucleus, and red-coloured matter. These cells likewise appear under two stages of development; colourless in the first and coloured in the second, in which last stage it constitutes the *red corpuscle*. In the early mammiferous embryo, he finds, in addition to the former, a third phase, that of *free vesicular nucleus*, exhibiting, like the nucleolated cell, the colourless and the coloured stages.

On examining the corpuscles of the lymph of vertebrate animals, the author finds them in all the classes to be identical in structure with their blood-corpuscles, and differing only in the inferior degree of coloration attending their last stage. In the oviparous classes, he observes that the nucleolated are more numerous than the granule cells, while in the mammifera the latter are predominant, which is the reverse of the proportion in which they exist in the blood of these animals. He finds that some of the nucleolated cells of the contents of the thoracic duct exhibit a marked degree of coloration, and have an oval shape; thus offering a resemblance with the blood of the early embryonic state.

The blood-corpuscles of all the invertebrate animals in which the author examined them, present the same phases of granule and nucleolated cells as in the higher classes, excepting that in the last stage of the latter phase the coloration is very slight, but the vesicular nucleus is frequently distinctly coloured. As in the higher classes, corpuscles exist in different states of transition from the granular to the nucleolated form of cell. In some of the invertebrata, corpuscles are found which appear to be the nuclei of some of the nucleolated cells become free; and these the author considers to be abortions, rather than examples, of cells having attained their third phase of free cells. Corpuscles are also met with in these animals, in greater or less abundance, belonging to the lowest forms of organic elements, namely, elementary granules.

The comparison which the author institutes between the blood-corpuscles of the vertebrate and invertebrate divisions of the animal kingdom, tends to show that they in all cases pass through similar phases of development, except with respect to the last, or coloured stage of the nucleolated cell, which they do not attain in the lower classes of animals. He finds that the blood-corpuscles of the crab, according to an analysis made by Professor Graham, contain a sensible quantity of iron, perhaps as much as red corpuscles. He considers the corpuscles of the blood of the invertebrata, inasfar as relates to the absence of nucleolated cells, as resembling those of the lymph of vertebrate animals.

"Observations on the Growth and Development of the Epider-

mis." By Erasmus Wilson, Esq., F.R.S., Lecturer on Anatomy and Physiology in the Middlesex Hospital.

The author adduces evidence derived from his microscopic observations, in confirmation of the commonly received doctrine respecting the origin of the cells of the epidermis and epithelium generally, from the materials furnished by the liquor sanguinis or plasma of the blood; which fluid, passing by endosmosis through the walls of the capillary vessels and peripheral boundary of the surface, developes granules by a vital process, analogous to coagulation. On a careful examination of the inner surface of the epidermis with the aid of the microscope, he finds it to be composed of four kinds of elements, arranged in such a manner as to constitute an irregular plane, similar to a tesselated or mosaic pavement. These elements are,—1. *Granules*, which the author terms *primitive*, of a globular form, solid and apparently homogeneous, and measuring about 1-20,000th part of an inch in diameter. 2. *Aggregated granules*, having about double the diameter of the former and apparently composed of as many of these as can be aggregated together without leaving an unoccupied space in the centre of the mass. 3. *Nucleated granules* measuring in diameter from the 6000th to the 4000th part of an inch, each being composed of an aggregated granule as a nucleus, enveloped by a single layer of aggregated granules, giving to the whole mass an oval or circular, and at the same time flattened shape. Their constituent granules have acquired, during this aggregation, greater density, and are separated from each other by distinct interstitial spaces filled with a transparent homogeneous substance. 4. *Nucleolo-nucleolated* cells pervading the deep stratum of the epidermis, and of which the longer diameter measures from the 3000th to the 2500th part of an inch. These cells, which constitute the principal portion, and may be regarded as the chief constituent of the epidermis, are formed from the nucleolated granules, on the exterior of which there is superposed a transparent layer, bounded by a well-defined outline, by the dark interstitial substance of the wall of the cell; the nucleolated granule being the nucleus, and the aggregated granule the nucleolus of these primitive cells of the epidermis. The author is of opinion that the nuclei, up to a certain point, grow with the cells, by the separation of the original granules from the deposition between them of interstitial matter, and also by the cleavage of the latter and the consequent multiplication of the granules. This peripheral growth of the cells is totally different from the mode of growth described by Schwann, and explains the disappearance of the nucleus in the scales of the epidermis. The observations of the author lead him to believe that the same process of development and of growth is followed in the epithelium as in the epidermis; and he offers evidence, showing that similar arrangements take place in the cells of melanosis, in the pigment cells of the choroid membrane of the eye, and in those of the skin of the negro.

"On the Temperature of Man." By John Davy, M.D., F.R.S. L. & E.

Having in a former paper shown that, contrary to a commonly

received opinion, the temperature of the human body, as measured by a thermometer placed under the tongue, is not a constant one, the author has resumed the inquiry, and gives, in the present paper, the results of numerous observations made with a particular instrument constructed for the purpose, admitting of minute accuracy (each degree of the scale being divided into ten parts), and when used with the precautions pointed out, affording satisfactory indications of the many problems which may be proposed relative to the temperature of man, &c., confining himself to a small number, and offering the information he brings forward only as a preliminary contribution in aid of their solution.

The paper is divided into seven sections.

The first treats of variations of temperature during the twenty-four hours. The author finds from his observations, that the temperature is highest in the morning, on rising after sleep; that it continues high, but fluctuating, till the evening; and that it is lowest about midnight, ranging on an average from 98·7 to 97·9.

The second, of variations during the different seasons. These, he finds, bear some relation to the temperature of the air, but less than might be expected; which he attributes to the majority of the observations having been made within doors, under circumstances peculiarly favourable to uniformity.

The third, of the influence of active exercise on the temperature. The effect of this, when not carried to the length of exhausting fatigue, he finds to be elevating; and that the augmentation is, within a certain limit, proportional to the degree of muscular exertion.

The fourth, of passive, such as carriage exercise. The effect of this in a cool air, contrary to that of quick walking or riding, would appear to be lowering.

The fifth, of abstinence from all exercise in a cold atmosphere. This he finds to be depressing in a still greater degree; sitting in a cold church has occasioned a reduction of temperature from 1° to 2°, the air of the church being from 42° to 32°.

The sixth, of sustained attention or exertion of mind. This would appear to have the effect of raising the temperature, but in a much less degree than bodily exercise.

The seventh, of taking food. It would appear that a light meal, such as breakfast, alters very little the temperature, whilst a heavy meal, such as dinner with wine, tends to lower it.

The conclusion drawn by the author from his observations, considered in their greatest generality, is, that the temperature of man is constantly fluctuating within a certain limit, regularly during the twenty-four hours; and irregularly according to the operation of certain disturbing circumstances.

Should multiplied observations give similar results, he infers that they will admit of many applications, both as regards the regulation of clothing, the warming of apartments, and it may be the prevention and cure of diseases,—conducive alike to increase of comforts and health.

Tables are appended containing a series of observations extend-

ing through eight months, in which not only the temperature of the body is noticed, but also the frequency of the pulse and of respiration, and the temperature of the air.

GEOLOGICAL SOCIETY.

Feb. 26, 1845.—A paper was read by Mr. Lyell, "On the Miocene Tertiary Strata of Maryland and Virginia, and North and South Carolina."

These rocks of the middle tertiary period are chiefly exhibited between the hill country and the Atlantic, and form a band of low and nearly level country, almost 150 miles wide, and not 100 feet high. They are assumed to belong to this period, because they are seen resting on the eocene deposits, and exhibit about the same proportion of recent species. The United States miocene beds consist chiefly of incoherent sand and clay, and the sandy beds, otherwise barren, have often been fertilized by the use of shell marl. In the suburbs of Richmond, Virginia, there is however a remarkable bed of siliceous sand, derived from the cases of infusorial animalcules. The paper was accompanied by comparative tables and lists of the fossils.

A paper, also by Mr. Lyell, "On the White Limestone and other Eocene Tertiary Formations of Virginia, South Carolina and Georgia."

The eocene beds extend chiefly to the south of the miocenes described in the foregoing paper, and are very widely spread in the Southern States on the shores of the Atlantic. The mineral character of the beds in the north is so like that of the cretaceous series, that were it not for the fossils, they might readily be mistaken; but towards the south a new mineral type is put on, and the rocks consist of highly calcareous white marl and white limestone. In point of fact, there seems to be as great a chasm between the cretaceous rocks and the tertiaries in America as in Europe.

A second part of Mr. Lyell's paper gave an account of a series of rocks, called in America the Burr-stone, a siliceous rock, containing fossil sponges, and belonging, it would seem, to the upper division of the eocene period.

March 12.—A communication was read by Prof. Sedgwick, "On the Comparative Classification of the Fossiliferous Slates of North Wales, with the corresponding deposits of Cumberland, Westmoreland and Lancashire."

The object of the author in this memoir was to give a general account of the Silurian rocks of the lake district of the North of England, comparing them with those of North Wales, so far as he had hitherto investigated the subject. In both there appears to be a series extending through the various members of the Silurian rocks. In the lake district, the Lower Silurian rocks are imperfectly seen, and are not more than 300 or 400 feet thick, the Ash Gill beds being the highest; but the Upper Silurians are admirably shown, and contain characteristic fossils. Of these latter, the Coniston limestone